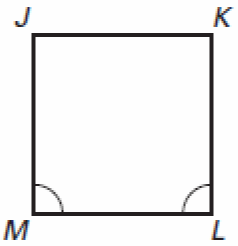
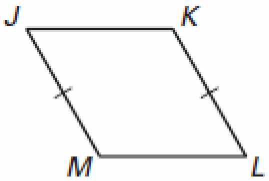
Pg 537 #3-15 multiples of 3, 19, 21, 26-29 all, 33-48 multiples of 3

3.



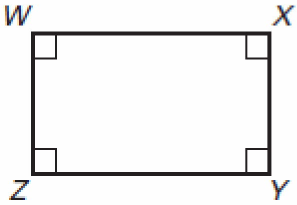
Sometimes; if rhombus *JKLM* is a square, then all four angles will be right angles and congruent.

6.



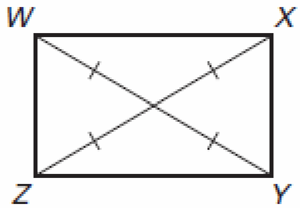
Always; all four sides in a rhombus are congruent.

9.



Always; a rectangle has four right angles and right angles are congruent.

12.



Always; the diagonals of a rectangle are congruent.

15. The quadrilateral is a square because all four sides and angles are congruent.

19. rectangle, square **21.** rhombus, square

26. The quadrilateral is a rhombus because all four sides are congruent.

$x^\circ + 104^\circ = 180^\circ$

$x = 76$

$3y = y + 8$

$2y = 8$

$y = 4$

27. The quadrilateral is a rectangle because all four angles are right angles.

$5x - 9 = x + 31$

$4x - 9 = 31$

$4x = 40$

$x = 10$

$4y + 5 = 2y + 35$

$2y + 5 = 35$

$2y = 30$

$y = 15$

28. The quadrilateral is a square because all four angles are right angles and the diagonals are perpendicular.

$$\begin{aligned} 5x &= 3x + 18 \\ 2x &= 18 \\ x &= 9 \end{aligned} \qquad \begin{aligned} 2y &= 10 \\ y &= 5 \end{aligned}$$

29. The quadrilateral is a parallelogram because both pairs of opposite sides are congruent, so $m\angle EFG = m\angle EHG$.

$$\begin{aligned} (5x - 6)^\circ &= (4x + 7)^\circ \\ x - 6 &= 7 \\ x &= 13 \end{aligned} \qquad \begin{aligned} 2y + 1 &= y + 3 \\ y + 1 &= 3 \\ y &= 2 \end{aligned}$$

33. The diagonals of a rhombus are perpendicular. So, $m\angle AED = 90^\circ$.

36. The diagonals form the right triangle AED and bisect $\angle D$.

$$\cos 37^\circ = \frac{8}{x}$$

$$x = \frac{8}{\cos 37^\circ}$$

$$x \approx 10$$

$$\begin{aligned} (DE)^2 + (AE)^2 &= (AD)^2 \\ 8^2 + (AE)^2 &\approx (10)^2 \\ (AE)^2 &\approx 36 \\ AE &\approx 6 \end{aligned}$$

39. $\angle PTS \cong \angle PRQ \cong \angle RQP \cong \angle PST$

$$\begin{aligned} m\angle PQR + m\angle QPR + m\angle PRQ &= 180^\circ \\ 34^\circ + m\angle QPR + 34^\circ &= 180^\circ \\ m\angle QPR + 68^\circ &= 180^\circ \\ m\angle QPR &= 112^\circ \end{aligned}$$

42.

$$\begin{aligned} m\angle PST + m\angle PSR &= 90^\circ \\ 34^\circ + m\angle PSR &= 90^\circ \\ m\angle PSR &= 56^\circ \end{aligned}$$

$$\begin{aligned} \sin(\angle PSR) &= \frac{QR}{QS} \\ \sin 56^\circ &= \frac{QR}{10} \\ 10(\sin 56^\circ) &= QR \\ 8.3 &\approx QR \end{aligned}$$

45. Diagonals bisect opposite angles.

$$m\angle LMK = \frac{1}{2} \cdot m\angle LMN = \frac{1}{2} \cdot 90^\circ = 45^\circ$$

48. Diagonals have equal lengths.

$$MP = 2 \cdot LK = 2 \cdot 1 = 2$$